

CLAIMS

1. A liquid crystal display device comprising:
a backlight;
5 a collimating element for collimating incoming light from the backlight
and transmitting the collimated light;
a liquid crystal cell for allowing the light coming from the collimated
element to pass therethrough; and
a viewing angle widening element for widening the viewing angle by
10 diffusing the light transmitted through the liquid crystal cell;
wherein the collimating element does not have a periodic pattern
structure that allows Moire fringes or interference patterns seen in optical
observation from a display side to be formed relative to a periodic pattern
structure of another optical member of the liquid crystal display device.
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2. The liquid crystal display device according to claim 1, wherein the
collimating element is a bandpass filter.
3. The liquid crystal display device according to claim 2, wherein the
20 bandpass filter is made of a cholesteric liquid crystal polymer material.
4. The liquid crystal display device according to claim 2, wherein the
bandpass filter is formed by vapor deposition of a material into a multilayer
structure.
- 25 5. The liquid crystal display device according to claim 2, wherein the
bandpass filter is formed by laminating resin materials respectively having

different refractive indexes into a multilayer structure.

5 6. The liquid crystal display device according to claim 5, wherein the multilayer structure is achieved by extruding the resin materials into a multilayer structure and then drawing the same.

7. The liquid crystal display device according to claim 5, wherein the multilayer structure is achieved by thin film deposition of the resin materials.

10 8. The liquid crystal display device according to any one of claims 1-7, wherein the collimating element has a thickness of not more than 200 μ m.

15 9. The liquid crystal display device according to any one of claims 1-8, wherein the collimation degree of the light coming from the collimating element is within $\pm 20^\circ$.

10 10. The liquid crystal display device according to any one of claims 1-9, wherein a light source of the backlight emits a bright-line spectrum.

20 11. The liquid crystal display device according to claim 10, wherein the light source is a three-band cold cathode lamp.

25 12. The liquid crystal display device according to claim 10, wherein the light source is a light emitting diode.

13. The liquid crystal display device according to claim 10, wherein the light source is an electroluminescence device.

14. The liquid crystal display device according to any one of claims 1-13,
wherein the viewing angle widening element is a diffusing plate that does not
substantially cause backscattering and does not substantially destroy a polarized
state.

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